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Mathematics News Letter

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Published in the interest of the Louisiana-Mississippi Section of the Mathematical Association of America and the Louisiana-Mississippi Branch of the National Council of Teachers of Mathematics.

A Challenge to Forward-looking Mathematics Teachers in the Colleges and High Schools of Louisiana and Mississippi.

Louisiana-Mississippi Section, Mathematical Association of America

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No. 3

COOPERATION

Of all the things that characterize any given successful modern business or professional program, if there is one thing more outstanding than another it is *cooperation of individuals*. To an even greater extent, if possible, is this true of every successful scientific program.

Who will be able to measure the nation-wide increase in scientific interest which has been generated by the recent assembling in Nashville of more than 2000 American scientists and the pooling of results of a year's research in fifty different but more or less related fields?

In some future issue of the News Letter it would be a fascinating task to analyze into all its elements the stimulating influence of the Nashville mathematical meetings on a Mr. Hypo-

thetical Doitalone who, after twenty-five years of insulated mathematics teaching in Podunk College, Valley-of-the-Nod, heard Pierpont on "*Mathematical Rigor, Past and Present*", Jackson on the "*Human Significance of Mathematics*," Harris on "*The Fundamental Requirements of Biology*" and Dresden on "*Some Philosophic Aspects of Mathematics*". But the fascinations of such analysis must be put aside for the present.

LOUISIANA-MISSISSIPPI SECTION AND LOUISIANA-MISSISSIPPI COUNCIL MOVING TOGETHER

Cooperation between the high school and the college in programs for the betterment of mathematics teaching, for a wider recognition of the values of a mathematical curriculum, and for the stimu-

lation of mathematical interest and activity, is now an established fact in Louisiana and Mississippi.

On March 30, 31, in Jackson, Mississippi, will be carried out the first *official* joint program of the two organizations. This program, just as was done at the Shreveport meeting last March, will be so arranged that college teachers shall be able to listen to papers prepared by secondary teachers on the teaching of secondary mathematics, and high school teachers shall be able to hear papers presented by workers in the college mathematics field.

February and March will be critical months in our program of preparation for this meeting. Responsibility for its success cannot, in the very nature of things, be confined to the seven officers of Section and Council, since such a restriction would imply that none of the other one thousand or more teachers needs to assume any share of such a responsibility. Precisely the contrary is true. The greater is the number of individual mathematics teachers of our two States who shall be led to recognize their own definite responsibilities in the campaign, the wider will be the influence of the Jackson meeting for the creation of mathematical interest where it does not now exist, and for the stimulation of those to mathematical activity, who, though members of the profession

of mathematics teaching, have ceased to do mathematical study or research.

OUR JACKSON HOSTS

In a brief but effective conference with Professor B. E. Mitchell of Milsaps College, during our one-day visit to the mathematical meetings in Nashville, interesting information came to light. Professor Mitchell is authority for the statement that on Friday evening, March 30, the visiting teachers and mathematicians are to be guests at a dinner to be jointly tendered to them by the Jackson Chamber of Commerce, Milsaps College, Belhaven College, Mississippi College. The participation of an organized body of commercial men in formal tribute to members of the mathematics teaching profession is one more evidence that clear-eyed business is not deceived in its appreciation of mathematics values.

LISTS---ONCE MORE

Attention is invited to the supplementary list of college mathematics teachers on page 17. It is possible that there are still some names not found either here or in the more general list printed in the last News Letter. If this is the case it is very probably due to the fact that Dean Hardin's written request for names has not been replied to by some to whom

inquiry was addressed. It is not intended that any individuals or colleges should be left out of the published lists.

A partial list of the teachers of high school mathematics in Mississippi is printed in this News Letter. It is hoped that proper supplementary lists can be put into future issues of the Letter. The present partial list was furnished us by the courtesy of D. C. Heath Book Company.

ONCE MORE WE EXPLAIN

Again we have been forced to fall back on our colleagues for some of the News Letter material. We had planned otherwise, in good time, had sent many requests to fellow mathematical workers in other institutions of our territory. To date, the coveted reactions have been slight.

As chairman of the Louisiana-Mississippi division of the M. A. of A., once more we earnestly urge the cooperation of the mathematicians of the two States in our efforts to make effective the official machinery which has already been set going for promoting mathematics in our territory. One of these pieces of adopted machinery is the Mathematics News Letter. Since there are approximately thirty colleges in the two States, it may reasonably be assumed that we have in our midst abundant sources of helpful material for the local mathemat-

ical organ. Indeed, we are convinced that it is abundant. Unlike the Tarpeian maiden who was overwhelmed by the beautiful shields which she wanted from the hands of the Roman soldiers, so far we have not been submerged by papers we have requested to be given us for News Letter use.

THE FUNCTION IDEA IN COLLEGE ALGEBRA

The function concept is vital in analysis, yet the majority of students encountering it seriously for the first time in the sophomore year, experience difficulty with it. It is entirely practicable for a competent instructor to interpret every topic of the ordinary college algebra course in *function terms* and thus to add strength to the student's later grasp of a first course in calculus.

Consider formulas

$$s = \frac{n}{2}(a+l), l = a + (n-1)d,$$

$$l = ar^{n-1}, s = \frac{ar^n - a}{r-1},$$

basic in the progressions. Both s and l are functions of the *integral variable* n , the first two *linear*, the second two *transcendental*. Binomial, permutation, combination formulas

$$(a+b)^n, n \dots n-r+1, \frac{n \dots n-r+1}{r \dots 2 \cdot 1},$$

respectively, are functions of the *integral variable* n . Identities in an *integral variable* are handled in

many cases of proof by mathematical induction, such as,

$$1^2 + 2^2 + \dots + n^2 = \frac{n \cdot n+1 \cdot 2n+1}{6}$$

$$1^3 + 2^3 + \dots + n^3 = (1 + 2 + \dots + n)^2$$

The value of the polynomial

$$x^n + a_1 x^{n-1} + \dots + a_n$$

is a function of the integral variable n if x has a fixed value, but a function of the continuous variable x if n and the coefficients are constant. If the value of the polynomial is arbitrarily restricted to zero, i. e. if

$$x^n + a_1 x^{n-1} + \dots + a_n = 0, (1),$$

x is no longer a continuous variable, but ranges over n numbers, not necessarily all distinct, these numbers defining the roots of equation (1).

Such methods of viewing ordinary algebra material in the function light may be used with discretion by the instructor, that is,

sparingly or extensively, depending on the ability level of the class. Manifestly, an attempt at formal rigor in administering the notion of continuity of a variable would be out of place with a first year group. On the other hand, the notion of correspondence between variables, the range of a variable under assigned conditions, dependence or independence of variables, the distinction between a function of one variable and a function of several variables, between single-valued and multiple-valued functions, the concept of a function of an integral variable—all these ideas can be introduced into and impressed upon the stronger freshman minds. Wholesome effects from such a procedure should be visible when, later, they seriously undertake the calculus.

LOUISIANA-MISSISSIPPI SECTION LEADING

By J. A. HARDIN
Vice-Chairman

One of the chief objectives in the minds of the organizers of the Mathematical Association of America was the creation of a strong bond of sympathy and cooperation between the teachers of college mathematics and the teachers of secondary mathematics. The importance of such sympathy and cooperation is too apparent to need discussion. Fur-

thermore it is obvious that this objective could not occupy any considerable place in the purpose of the American Mathematical Society whose chief and supremely important concern is the extension of the boundaries of mathematical knowledge.

In working toward a realization of this objective, the Louisiana-Mississippi Section is setting

the pace for the sixteen other Sections of America. Not that we of this Section would claim any great achievements as yet, but that important foundations have been laid upon which the high school teachers and the college teachers may now come together and build.

At the recent meeting of the Mathematical Association of America in Nashville, following Professor Betz's paper on "*The Reconstruction of Secondary Mathematics*," there was considerable discussion concerning the cooperation of the college and the high school people in mathematics. The opinion was rather freely expressed that the situation in America did not compare favorably with that in France and England, that many of the college teachers seemed too busy even to accept invitations from the secondary teachers to appear on their programs, whereas there was need that college teachers be willing to give time for study and work on committees looking toward the improvement of the

mathematical curriculum in high schools and more effective teaching of mathematics in high school and college.

During this discussion, Professor Slaught pointed out that there were evidences that America was making some progress in this direction. He mentioned, in particular, the Louisiana-Mississippi Section and described its plan of cooperation with the Louisiana-Mississippi Branch of the National Council of Teachers of Mathematics. His remarks thrilled the Louisiana and Mississippi people who were in attendance. Coming from one of the organizers of the M. A. of A. and one of the recognized mathematical leaders of the country, Professor Slaught's praise of the plans of the Louisiana-Mississippi Section and the Louisiana-Mississippi Branch of the National Council should make every teacher of mathematics in the two States eager to take part in the movement. The opportunity is now ours to make rapid and solid progress.

WHY HAVE A MATHEMATICS TEACHERS' ORGANIZATION ?

By W. C. ROATEN
DeRidder, La.

With the greater industrial development that is now taking place in the South, and the rapidly changing attitude of peo-

ple towards high school and college training, bringing an ever increasing number of young people into these institutions, there

must necessarily come a new emphasis on the teaching of mathematics. Because of their knowledge of the subject and of the demands being made for this increased emphasis, the mathematics teachers themselves are the people upon whom must rest the responsibility for their meeting this increased demand. While mathematicians employed in the various industries and scientific investigations that are going on in the world may realize the need for increased emphasis on this important subject, they are too busy with their own work to give any time to an attempt to in-

crease the interest in the subject. So, in order that the procedure be carried out systematically and that there be no lost motion in the process there must be an organization of those who are attempting to do the work. And this organization must not be a closed corporation, made up of a few leaders among the teachers of the South, but it must contain the rank and file of the high school and college mathematics teachers.

Hence the necessity for getting the teachers enlisted in, and actively at work for, the organizations for which the News Letter stands.

SOME REFLECTIONS ON THE MATHEMATICS MEETINGS AT NASHVILLE

By W. PAUL WEBBER
Louisiana State University

Granting the existence of the things we see about us, the next most obvious fact of nature is variation or change. Rivers change their courses, commodities change their prices, styles in dress change. To some it may be a shock to learn that mathematics changes its styles too. Each generation of mathematicians has its hobby. A few years ago a large group specialized on integral equations, then a new field. Previous to that, number theory and aggregate theory had had their turns. For more than half a century the rules of evi-

dence in mathematics and foundations have had much attention. According to the opinions of some of our recent leaders the rules of evidence are too restrictive, and some revision of the logic of rigor must be made in order to allow the investigators to proceed. Professor Pierpont reviewed, in a congenial and masterly manner, the history of the standards of mathematical rigor from the time of the ancients. He pointed out how each race and generation laid down its rules of evidence and how the next generation revised these and added

its own notions; and how, in turn, these were shelved in favor of new ones. The doctrine of limits and the principle of "necessary and sufficient, etc." have done much to continue to be serviceable. But a new school of reasoners must have more liberty. They insist on the recognition of certain elements of intuition in mathematical rigor. This new doctrine of intuition is not to be so childlike in its faith as was that of our forefathers. Let us wait and see what it can do. Professor Dresden of Swarthmore treated some phases of this topic from a philosophical view-point.

Another topic that has claimed increasing attention in recent years is statistics. A very noticeable portion of the programs of the Society has to do with statistical methods and their applications to modern life. This is in response to the needs and opportunities in the social and biological sciences. So pressing is the need of elementary instruction in statistical methods in the freshman year in college courses that a biologist appeared in person before the Mathematical Association making a plea for this subject in the early part of the college instruction in mathematics. It is the belief of the writer that this matter should receive attention if mathematicians are to uphold their claim to merit in service and efficiency.

Another interesting general pa-

per was that of Professor Jackson of Minnesota. He made a defense of and a plea for the human value of mathematics. He acknowledged that for the present enough had been said about the utilitarian values of mathematics and of the disciplinary value of mathematics. His talk emphasized the subjective values of mathematical study for the student. The thrills and satisfactions obtained from mathematical discoveries, the broadening effect on the mind of extensive studies in mathematics, are not negligible elements in citizenship. This discussion was just a little different and contained a number of suggestions to those who heard it.

The lecture of Professor Brown of Yale on resonance in the motions of the heavenly bodies furnished a pleasant hour. It was truly a theory of the music of the spheres. He very amiably stated some of the results of his struggles with certain almost incorrigible differential equations. He exposed beauty where one would not expect it, and produced music from instruments so ugly looking that sight of them on the blackboard filled one with fear. Truly the wonders of modern astronomy dwarf to insignificance the mysteries of the ancients.

There were the usual papers on the classic topics of mathematics. The writer could not hear all of them, nor have understood if he

had heard them. One thing he noticed was a tendency to more use of vector theory and evidence of some progress in the use of hypercomplex numbers in function theory.

Not to be forgotten were the cordial reception and comfortable accommodations afforded the mathematics people at the Ward-Belmont College for Women.

THE JOINT MATHEMATICAL INTERESTS OF COLLEGE AND SECONDARY TEACHERS AS SEEN IN THE MATHEMATICS NEWS LETTER

By MRS. L. T. LONGMIRE
Secretary-Treasurer

Just as organized effort promotes the efficiency of any enterprise, so mathematical organizations promote efficiency in high school and college mathematics. The activities of the Mathematical Association of America, the American Mathematical Society, and the National Council of Teachers of Mathematics have unquestionably been leading factors in the increased efficiency of the mathematics departments of high schools, colleges and universities.

The secondary teachers of Louisiana and Mississippi are fortunate in that they, organized as the Louisiana - Mississippi Branch of the National Council of Teachers of Mathematics, are able to meet in joint session and to cooperate with the Mathematical Association of America. This affiliation is certain to bring about better understanding between the college and the secondary teachers of mathematics. The college

teachers will come face to face with the problems of the high school teachers, both will assume the responsibility and work together for a solution.

Aside from the advantages to be gained in a professional way, the social contacts one makes with men and women from the great mathematical centers of the country at a joint meeting of this kind are well worth the time of secondary teachers. These contacts afford an inspiration that secondary teachers are taking advantage of as was evidenced by the attendance at the Shreveport meeting last March and as will be evidenced to a greater degree, we believe, by the attendance at Jackson next spring.

In order to strengthen the bond that has been officially formed between college and secondary teachers it is important that every mathematics teacher in the two States read and support the "Mathematics

News Letter". There is no greater incentive to the teacher than to feel that she must measure up to the standards set by the leaders in her community. The "Mathematics News Letter" is a means by which every teacher can keep in touch with the mathematical programs and projects of her community and a means through which the individual can serve others by sending for publication material that is of value to high school teachers. It is believed by the leaders in the field that high school boys and girls can learn more mathematics than our present curriculum demands and for this reason there is a tendency towards shifting down of college freshman mathematics into the high schools. As new techniques are worked out and old ones refined, let us pass them along through the medium of the "News Letter" for the purpose of bringing all secondary teachers in contact with the recent developments in the teaching of mathematics.

In a recent report by Mr. Trudeau, Louisiana High School Supervisor, the following figures were sent out showing the decrease in the percentage of failures in mathematics in Louisiana high schools based on a compari-

son of the figures in 1921-22 with those in 1926-27. In arithmetic in 1921-22, 29% failed, with 20% in 1926-27; in first year algebra 26.5% failed, with 20% in 1926-27; in second year algebra 25.6% failed, with 7% in 1926-27; in geometry in 1921-22, 27.4% failed with 15% in 1926-27. While the decrease in the percentage of failures is marked there is room for improvement. Improved teaching methods used in instruction is largely responsible for this reduction in percentage of failures. Let us hope secondary teachers will take advantage of such aid as the "News Letter" has to offer.

The "News Letter" is the outward expression of the bond that unites the two National organizations and through it the mathematics teachers of Louisiana and Mississippi are advised of the plans and programs of both the Association and the Council. Read the "News Letter" if you would know "who's who" in mathematics in Louisiana and Mississippi. Come to the joint meeting in Jackson, Mississippi, March 30, 31 to see and hear the leaders in the world wide move to aid in conserving time and effort on the part of both teachers and students.

SUPPORT THE NEWS LETTER

By P. K. SMITH
Secretary-Treasurer

I know of no other section of the M. A. of A. that is attempting to publish periodically a local organ. In this move I think we are unique among all of the sections. The idea of the official group, composed of four college and three high school teachers, is to make the Mathematics News Letter a real live magazine with its chief objective the development of local interest in better teaching and in investigation. Time will be required before the News Letter can approximate the stage of perfection we have in mind. But, we must start—we have started and have made progress. We need your support and encouragement. Very little is asked. We should be able to secure eight hundred subscribers in the two States. For the nominal sum of fifty cents per subscriber, we can cover the cost of printing and mailing for the time the paper runs during the year.

We are in need of funds. Will

you support the work by sending us a one year subscription fee? Several have sent in a two year subscription. We shall appreciate either. Will you support our work financially to this extent?

The financial question is a large one. However, the question of material for the Letter is always before the editor. As you go about your class work there must occur to you better methods of solving certain problems; methods that your students grasp more readily. These methods should be written up and sent to the editor, Prof. S. T. Sanders. Discussions of presentation or of present tendencies in the field would be acceptable. Don't feel that your material can't be used. We are anxious for the college and high school teachers to speak out. We must, before the Letter will ring with a local spirit. Fellow teachers, assume part of the responsibility. Let us have a real pride in the Letter and make it a success.

NORMAL FORM OF THE STRAIGHT LINE

By P. K. SMITH
Secretary-Treasurer

Students often experience difficulty in appreciating the full significance of transforming the equation of a straight line in the general form

(1)

$$Ax + By + C = 0$$

into the normal form

$$(2) \quad x \cos u + y \sin u - p = 0$$

The following procedure is suggested which may be helpful.

Consider any line L having its equation in the general form (1) and not passing through the origin. There will then be a unique set of values for p and u such that L has also the equation (2). As yet we do not know the values of $\cos u$, $\sin u$ and p ; our problem is to solve for these quantities in terms of the given quantities A, B, C .

Since (1) and (2) both represent the same line L , the values which they give for the slope* of L are equal, that is,

$$(3) \quad -(\cos u)/(\sin u) = -A/B.$$

For the same reason the values which they give for the y -intercept of L are equal, that is,

$$(4) \quad p/(\sin u) = -C/B.$$

Moreover from trigonometry

$$(5) \quad \sin^2 u + \cos^2 u = 1.$$

Now solve (3), (4), (5) simultaneously for $\cos u$, $\sin u$, p ; we get

$$(6) \quad \cos u = A/R, \sin u = B/R, p = -C/R,$$

where

$$(7) \quad R = \pm \sqrt{A^2 + B^2}.$$

It appears from (7) that we may have two normal forms for L ; we avoid this difficulty by observing that p must always be positive in the normal form. Hence, by (6), C and R must have opposite signs, so that the plus sign must be taken in (7) if C is negative while the minus sign must be taken if C is positive. Thus the normal form of the equation of L is

$$(8) \quad (A/R)x + (B/R)y + (C/R) = 0,$$

where R is given by (7) subject to the above convention of sign.

It remains to consider the case where L passes through the origin. If in this case it is agreed that the positive direction of the normal is upward and that u is less than 180 degrees, we again have a unique set of values of p and u . In this case $p=0$ and $\sin u > 0$. We again have (8) as the normal form with R given by (7), with the understanding that the sign in (7) is plus or minus according as B is positive or negative.

*We here assume that L is not parallel to the y -axis; if it is, it is easily seen that (8) is still valid.

PROBLEMS AND SOLUTIONS

By H. L. SMITH
Louisiana State University

Problem proposed by P. K. Smith. Show that the number of terms in the expansion of

$$(a) \quad \sum_{r=1}^m (x_1 + x_2 + \dots + x_k)^r$$

is $\sum_{k=1}^m C(n, r)C(k, r)$, where m is the smaller of n and k , and where

$C(n, r) =$ the number of combinations of n things taken r at a time $= [n(n-1) \dots (n-r+1)]/(r!)$, and where $C(k, r)$ has a similar meaning.

Solution by H. L. Smith. Let us denote the expression (a) briefly but sufficiently explicitly by $f(n, k)$. We shall show first that the number of terms in $f(n, k)$ each of which contains precisely the first r letters of the set

$$(b) \quad x_1, x_2, \dots, x_k$$

(that is, contains each of these letters and no others) is $C(n, r)$. (Here r is necessarily at most equal to m .) The proof is by mathematical induction. We note first that the result is true for $f(n, 1)$. We then assume the result true for $f(n, 2), f(n, 3), \dots, f(n, k-1)$ and seek to prove it true for $f(n, k)$. Now the terms of $f(n, k)$ which contain precisely the first r letters of (b) are of the following types:

- (1) those which contain x_r to the first power;
- (2) those which contain x_r to the second power;

.....

$(n-r+1)$ those which contain x_r to the $(n-r+1)$ power. But the number of terms of type (1) is equal to the number of terms in $f(n-1, r-1)$ which contain precisely the first $r-1$ letters of (b); the number of terms of type (2) is equal to the number of terms in $f(n-2, r-1)$ which contain precisely the first $r-1$ letters of the set (b); and so on. Hence the total number of terms of all types is

$$C(n-1, r-1) + C(n-2, r-1) + \dots + C(r-1, r-1)$$

or $C(n, r)$.

We have thus shown that the number of terms in $f(n, k)$ which contain precisely the first r letters of (b) is $C(n, r)$. But there would be exactly the same number of terms which would contain precisely any other selection of r letters from among the set (b), and since there

are $C(k,r)$ such selections, the number of terms of $f(n,k)$ which contain exactly r letters is $C(n,r)C(k,r)$. Finally, a term from $f(n,k)$ may contain any number of letters from 1 to m inclusive; from which the required result follows.

By making the count in a different way the reader will find that the number of terms in (a) is $C(n+k,n)-1$.

Problem proposed by H. L. Smith. Show that the inequality

$$\begin{aligned} & |(x_1-x_2)(y_1+y_2) + (x_2-x_3)(y_2+y_3) + (x_3-x_1)(y_3+y_1)| \\ & \leq |x_1-x_2| |y_1-y_2| + |x_2-x_3| |y_2-y_3| + |x_3-x_1| |y_3-y_1| \end{aligned}$$

holds for all real values of the six letters involved, and give a geometric interpretation.

A TALK ON "THE HIGH SCHOOL MATHEMATICS RECITATION"

By W. C. ROATEN
DeRidder, La.

This subject was not chosen because the speaker has any new ideas on the subject, but rather for the purpose of restating and emphasizing some well known principles. The statements and conclusions here discussed have come as a result of practical school room experience; and, since they have brought more or less satisfactory results where used, it is believed that they may be adopted and adapted for the use of others.

The recitation in, as well as the study of, any subject presupposes a definite purpose in pursuing that subject. There are at least three well defined reasons for the study of mathematics:

1. To gather material that may be used in further study of the

subject or in the practical application of mathematical principles in the broader affairs of life.

2. To gain pleasure from achievement.
3. To form thinking habits.

Any one of these is of sufficient value to justify a renewed interest in the study of this great subject.

There may be three purposes in view in the recitation:

1. To give the pupils who care to know, an idea of their own progress.
2. To furnish data from which the teacher may learn whether he is getting the desired results.
3. To provide the teacher an opportunity for real teaching.

Of course it is easily seen that the last of these is by far the most important. It should be borne in mind, too, that "recitation" as

here used does not mean the method of "hearing lessons" which is sometimes employed.

The speaker uses a combination of the oral and written form of recitation, letting the pupils do the maximum amount of the talking.

After the class has devoted about forty minutes to the careful preparation of the lesson under the supervision of the teacher, the members are asked to take paper and pencil preparatory to taking up the recitation, which takes about forty minutes more. The teacher has a list of from five to seven questions on the lesson which he proceeds to dictate to the class, giving time between the questions for the class to write the answers. No discussion is allowed during this part of the work. As soon as the last question has been answered, no time being given for revision, the papers are folded and names written on them, and they are passed to the front of the class from where they are distributed again. The teacher then reads the first question and calls for the answer written by a certain member. This answer is then discussed by the class, other answers are read and discussed, this process continuing until an answer satisfactory to the class has been found or worked out, after which a proper grade is put on each paper by the member holding it. This is continued until all ques-

tions have been answered and graded. The grades are then summed up and placed on the back of the paper. It should be noted that during this discussion the teacher has an opportunity for correcting any misapprehension on the part of the pupils and of leaving in their minds a clear conception of what is of most value, this being done chiefly by leading the pupils by judicious questions to develop the point desired. This is followed by a short summarization of the lesson during which any point not touched upon previously is discussed, and the most important points are given emphasis. The papers are taken up and the marks on them form the basis of the pupils' daily grades. In geometry there should be figures on the board, references to which are made in the questions; in trigonometry, figures and formulas may be on the board; and in algebra, problems, formulas, and figures may be in sight.

This method presents several advantages: 1. It develops a mathematical vocabulary. Every teacher knows how difficult it is to get pupils to use mathematical words and phrases in answering questions orally. But when they know they will be required to write these expressions they take more care in getting them in mind. 2. This method gets the attention of the whole class. This can never be secured in an oral

recitation. 3. It gives each member of the class something to do. When pupils are sent to the board to do work or when the questions are asked orally, those who are not directly involved in the work get listless or find something to do that is not a part of the program. 4. This method develops the power of concentration. It is insisted that the questions be answered as rapidly as possible, giving no time for inspiration which may come from across the aisle. 5. Since each pupil must answer all questions, this method makes every member responsible for the entire assignment, whereas in an oral recitation he may get by with only one-twenty-fifth of it. Knowing this, each one prepares accordingly. 6. Since the shortest possible answers are insisted upon, each pupil tries his best to make his answers definite. Thus the habit of being direct and definite is formed. 7. This method prevents waste of time on the part of the teacher. By giving close attention to the answers given by the different pupils to the written questions, he may learn what the weak points are, so he

knows just what points need further elucidation. 8. The pupils themselves learn where their weak points are; and, if they are real students, they will attempt to strengthen the weak points.

Care must be exercised in the choice of questions used. In algebra the questions should attempt to bring out the reason for the steps taken in solutions. In geometry and trigonometry there should be few questions beginning with "what", only a few more with "how", and the great majority should begin with "why". The aim should be to ask questions as well as develop the reasoning powers and thus form the habit of carefully thinking out answers to questions, with only a minimum of those which appeal to memory only. It should be remembered that it is not the number of questions asked but the thoroughness with which they are treated that is worth the most.

It should be noted in closing that while this method was developed in a school that gives 85 minutes to the recitation period it may be adapted to those classes where the recitation is only 60 minutes or less.

CORRESPONDENCE

New Orleans Normal School, January 5, 1928.

Mr. S. T. Sanders,
Baton Rouge, La.

My dear Mr. Sanders:

Your letter of December 9th was received and was misplaced; hence the delay in answering.

I am deeply interested in anything that is conducive to getting better results in the teaching of mathematics and if the Mathematics News Letter will help to get results, I shall be glad to lend my support to it.

I will do what I can in an effort to interest the mathematics teachers of the New Orleans Public School and High School teachers in this movement. A list of these teachers is available and I will get in touch with them in reference to the publication.

You may enter my name upon the list of subscribers. Check enclosed.

Yours truly,

DORA M. FORNO.

A. & M. College, Mississippi,
January 2, 1928.

Prof. S. T. Sanders,
Louisiana State University,
Baton Rouge, La.

Dear Prof. Sanders:

I am sorry to say that we have been so busy the past few days that I haven't found time to write anything for the next News Letter. We are changing over from the semester system to the quarter system and are very busy revising the courses of study and writing up the new catalog.

However, I am sending check for \$5.00 to help pay expenses of publication. I think you are doing great good in this work, and if I were rich I would endow our section of the Society with sufficient funds to insure the permanency of our publication.

Yours very truly,

H. FOX.

Oberlin, Ohio, January 2, 1928.

My dear Professor Sanders:

Professor Slaught will plan with you, I know, with regard to the spring meeting. You spoke of the possibility of my coming down. It would be very pleasant to be there at the meetings, and to get to know the members in Louisiana and Mississippi. Mr. Slaught will have in mind whether there is better material available for this purpose than the "present speaker". I'm sure that we want to do the very best we can to inspire the members in your region, as in other regions, and whatever seems best to Mr. Slaught, I'll be quite ready to accept.

I have an address on "*The Fascinating Side of Mathematics*", or I could tell of the work I have been doing in trying to find what Napier meant by his logarithms; the latter shows how a problem *grows* on one. But let us first hear from Mr. Slaught. Am sending him a copy.

Hastily yours,

W. D. CAIRNS, *Sec'y-Treas.*

M. A. of A.

University of Maryland, College Park,
January 4, 1928.

Prof. S. T. Sanders,
Baton Rouge, La.

My dear Sir:

Upon my recent return from my old "home-town"—Canton, Mississippi, I found

Vol. 2, No. 2 Mathematics News Letter awaiting me. It is the first copy I have seen and I am pleased with it and the idea.

I would like a complete file and to subscribe for it. Please favor me with Vol. 1 complete and No. 1 of Vol. 2.

Please note my mailing address as given below and send all mail to it. I wish you unbounded success, and hope to send you an article as soon as I get the detailed idea of the magazine.

Thank you. Kind regards. Yours,

HARRY GWINNER,
1207 W. Mulberry Street,
Baltimore, Md.

Oberlin, Ohio, January 4, 1928.

Professor S. T. Sanders,
Louisiana State University,
Baton Rouge, La.

My dear Professor Sanders:

I am glad to inform you that Louisiana State University was elected to institutional membership in the Mathematical Association of America by the Trustees at the meeting December 30, 1927.

The dues for 1928 have been paid.

Yours very truly,
W. D. CAIRNS, *Sec'y-Treas.*,
M. A. of A.

Holy Cross College, New Orleans, Louisiana,
December 7, 1927.

P. K. Smith,
Hattiesburg, Miss.

Dear Sir:

Enclosed find one dollar for two years subscription to the "Mathematics News Letter."

The "News Letter" is a fine thing to keep up interest in mathematics, and to supply the connecting link that will serve to bring mathematics teachers in closer touch with each other.

Keep up the good work, and be assured of my heartiest cooperation.

Yours very truly,
BROTHER GODFREY, C. S. C.

SUPPLEMENTARY LIST OF COLLEGE MATHEMATICS TEACHERS IN LOUISIANA AND MISSISSIPPI

Miss Dora M. Forno, New Orleans Normal School, New Orleans, La.

Mr. N. Smylie, Belhaven College, Jackson, Miss.

Professor J. R. Hitt, Mississippi College, Clinton, Miss.

Mr. V. B. Temple, Mississippi College, Clinton, Miss.

Miss Julia Dale, Delta State Teachers' College, Cleveland, Miss.

Professor B. A. Tucker, Southeast Louisiana College, Hammond, La.

Brother Godfrey, Holy Cross College, New Orleans, La.

Professor P. K. Smith, Mississippi College for Women, Hattiesburg, Miss.

PARTIAL LIST OF MATHEMATICS TEACHERS IN MISSISSIPPI (1927-28)

- Miss Ruth Tucker, Bassfield Consolidated School, Bassfield, Miss.
- Miss Annie Lee Segrest, Bassfield Consolidated School, Bassfield, Miss.
- Mr. R. N. Price, Superintendent, Batesville High School, Batesville, Miss.
- Mr. M. L. Burks, Batesville High School, Batesville, Miss.
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- Mr. H. G. Franks, Belmont High School, Belmont, Miss.
- Mr. J. W. Summers, Superintendent, Belmont High School, Belmont, Miss.
- Mr. W. R. Applewhite, Superintendent, Yazoo County Agricultural High School, Benton, Miss.
- Mrs. C. C. Drake, Bogue Chitto High School, Bogue Chitto, Miss.
- Mrs. K. P. Walker, Forrest County Agricultural High School, Brooklyn, Miss.
- Mr. J. M. Weems, Forrest County Agricultural High School, Brooklyn, Miss.
- Mr. A. M. Moore, Superintendent, Bude High School, Bude, Miss.
- Mr. J. M. Pearson, Superintendent, Agricultural High School, Buena Vista, Miss.
- Mr. S. Keith, Principal, Madison County Agricultural High School, Camden, Miss.
- Mr. James L. Hodge, Canton High School, Canton, Miss.
- Mr. C. C. Hughes, Canton High School, Canton, Miss.
- Miss Mary Iazard, Carson Consolidated High School, Carson, Miss.
- Mr. Hubert Applewhite, Carson Consolidated High School, Carson, Miss.
- Mr. H. A. Pollard, Superintendent, Leake County Agricultural High School, Carthage, Miss.
- Mr. E. F. Mitchell, Leake County Agricultural High School, Carthage, Miss.
- Mr. J. C. Trussell, Superintendent, Tipah County Agricultural High School Chalybeate, Miss.
- Miss Mary Lou Ratliff, Tallahatchie Agricultural High School, Charleston, Miss.
- Mr. C. A. Massey, Superintendent, Wayne County Agricultural High School, Clara, Miss.
- Miss Dora McFarland, Wayne County Agricultural High School, Clara, Miss.
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- Miss Leila Mae Shell, Elizabeth Dorr High School, Clarksdale, Miss.
- Miss Lorraine Shell, Elizabeth Dorr High School, Clarksdale, Miss.
- Miss Mary Goode, Elizabeth Dorr High School, Clarksdale, Miss.
- Mrs. B. A. Summer, Jr., Columbia High School, Columbia, Miss.
- Mrs. Irma Ball, Columbia Junior High School, Columbia, Miss.
- Mr. J. B. Chevis, Columbus Junior High School, Columbus, Miss.
- Mrs. S. M. Clayton, Como Public Schools, Como, Miss.
- Miss Ruth Spaulding, Newton County Agricultural High School, Decatur, Miss.
- Miss Rubye Evans, Calhoun County Agricultural High School, Derma, Miss.
- Mr. Z. J. Van Landingham, Drew High School, Drew, Miss.
- Mr. M. P. Bush, Superintendent, Jones County Agricultural High School, Ellisville, Miss.
- Mrs. R. A. McLemore, Jones County Agricultural High School, Ellisville, Miss.
- Mr. S. C. Wallace, Jones County Agricultural High School, Ellisville, Miss.
- Mrs. A. C. L. Smith, Jones County Agricultural High School, Ellisville, Miss.
- Mrs. E. L. Landrum, Edwards High School, Edwards, Miss.

- Miss Myra Buckley, Escatawpa High School, Escatawpa, Miss.
- Mr. A. F. Megehee, Principal, Escatawpa High School, Escatawpa, Miss.
- Mrs. J. A. Travis, Superintendent, Webster County Agricultural High School, Eupora, Miss.
- Miss Patti Lamb, Webster County Agricultural High School, Eupora, Miss.
- Mr. J. B. Leslie, Itawamba County Agricultural High School, Fulton, Miss.
- Miss Elizabeth Harris, Itawamba County Agricultural High School, Fulton, Miss.
- Mr. H. G. Fenton, French Camp Academy, French Camp, Miss.
- Mr. Troy Morgan, Superintendent, Gallman Consolidated School, Gallman, Miss.
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- Mrs. E. B. Stinson, Greenwood High School, Greenwood, Miss.
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- Miss Corrinne Nicolls, Greenwood High School, Greenwood, Miss.
- Mr. G. G. Lyle, Scott County Agricultural High School, Harpersville, Miss.
- Mr. H. R. Carter, Scott County Agricultural High School, Harpersville, Miss.
- Mr. S. H. Blair, Principal, Hattiesburg Junior High School, Hattiesburg, Miss.
- Miss Agnes Howie, Hattiesburg Junior High School, Hattiesburg, Miss.
- Miss Bessie Thrash, Hattiesburg Junior High School, Hattiesburg, Miss.
- Mr. J. W. Currie, Hattiesburg High School, Hattiesburg, Miss.
- Miss Ruth McDonald, Hattiesburg High School, Hattiesburg, Miss.
- Miss Frances Cain, Hazlehurst High School, Hazlehurst, Miss.
- Mr. E. R. Jobe, Superintendent, Hazlehurst High School, Hazlehurst, Miss.
- Mr. J. S. Green, Principal, Indianola High School, Indianola, Miss.
- Mr. B. H. Biggers, Rankin County Agricultural High School, Johns, Miss.
- Miss Annie L. Anderson, Montgomery Agricultural High School, Kilmichael, Miss.
- Mr. L. H. Jobe, Superintendent, Montgomery Agricultural High School, Kilmichael, Miss.
- Mrs. E. B. Harrison, Montgomery Agricultural High School, Kilmichael, Miss.
- Miss Mary Haynes, Kosciusko High School, Kosciusko, Miss.
- Mr. H. F. Gregory, Principal, Agricultural High School, Kossuth, Miss.
- Miss Minnie Belle Fairman, Agricultural High School, Lamar, Miss.
- Mr. C. F. Dodson, Principal, Greene County Agricultural High School, Leakesville, Miss.
- Miss Christine Montgomery, Greene County Agricultural High School, Leakesville, Miss.
- Mr. H. F. Stout, Superintendent, Amite County High School, Liberty, Miss.
- Mr. Joe Philips, Amite County High School, Liberty, Miss.
- Mr. H. Cox, Oktibbeha County Agricultural High School, Longview, Miss.
- Miss Sara Craig, Attala County Agricultural High School, McAdams, Miss.
- Mr. B. H. Lewis, Superintendent, Noxubee County Agricultural High School, Mashulaville, Miss.
- Miss Evelyn Henderson, Noxubee County Agricultural High School, Mashulaville, Miss.
- Mrs. W. E. Thompson, Principal, Agricultural High School, Meadville, Miss.
- Mr. F. L. McCue, Franklin County Agricultural High School, Meadville, Miss.
- Miss Marie Parber, Simpson County Agricultural High School, Mendenhall, Miss.
- Mr. V. C. Williams, Superintendent, Simpson County Agricultural High School, Mendenhall, Miss.
- Mrs. A. J. Tullios, Smith County Agricultural High School, Mize, Miss.
- Miss Vinter Fox, Sunflower County Agricultural High School, Moorehead, Miss.
- Mrs. L. A. Barr, Sunflower County Agricultural High School, Moorehead, Miss.

- Mr. J. S. Vandiver, Superintendent, Sunflower County Agricultural High School, Moorehead, Miss.
- Miss Edna Walker, Winston County Agricultural High School, Noxapater, Miss.
- Mr. L. G. Wallace, Superintendent, Yalobusha County Agricultural High School, Oakland, Miss.
- Mr. W. D. Gooch, Superintendent, Agricultural High School, Olive Branch, Miss.
- Mr. J. B. Edwards, Superintendent, Lafayette County Agricultural High School, R. F. D., Oxford, Miss.
- Miss Maude Edwards, Lafayette County Agricultural High School, R. F. D., Oxford, Miss.
- Mr. Lee Coney, Pace High School, Pace, Miss.
- Mr. R. P. Patty, Pace High School, Pace, Miss.
- Mr. W. G. Gregory, Harrison-Stone-Jackson County Agricultural High School, Perkinston, Miss.
- Mr. F. O. Parsons, Harrison-Stone-Jackson County Agricultural High School, Perkinston, Miss.
- Miss Dorothy Williams, Harrison-Stone-Jackson County Agricultural High School, Perkinston, Miss.
- Mr. W. C. Mabry, Jr., Clay County Agricultural High School, Pheba, Miss.
- Mr. M. E. Klindworth, Philadelphia High School, Philadelphia, Miss.
- Miss Ione Rush, Philadelphia High School, Philadelphia, Miss.
- Mr. Kelton Montgomery, Philadelphia High School, Philadelphia, Miss.
- Mr. L. S. Davidson, Principal, Pope High School, Pope, Miss.
- Mr. J. C. Harden, Pearl River County Agricultural High School, Poplarville, Miss.
- Mr. J. R. Hillman, Pearl River County Agricultural High School, Poplarville, Miss.
- Miss Jane Musselwhite, Lamar County Agricultural High School, Purvis, Miss.
- Mr. H. G. Everett, Clarke County Agricultural High School, Quitman, Miss.
- Mr. H. G. Laird, Hinds Junior College, Raymond, Miss.
- Mr. G. J. Cain, Hinds Junior College, Raymond, Miss.
- Mr. W. E. Watts, Loyd-Star Consolidated School, Redstar, Miss. (Mail—Wesson, Miss.)
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- Miss Faith Clayton, Kemper County Agricultural High School, Scooba, Miss.
- Miss Josephene Stevens, Tate County Agricultural High School, Senatobia, Miss.
- Mr. P. W. Berry, Superintendent, Tate County Agricultural High School, Senatobia, Miss.
- Mr. C. R. Mosier, Pike County Agricultural High School, Summit, Miss.
- Miss Martha Mitchell, Tishomingo County Agricultural High School, Tishomingo, Miss.
- Mr. J. T. Shultz, Tunica Agricultural High School, Tunica, Miss.
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- Mr. John Neel, Superintendent, Union Consolidated High School, Tylertown, Miss.
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- Mr. J. Coyt Hutchinson, Choctaw County Agricultural High School, Weir, Miss.
- Mr. J. M. Ewing, Principal, Copiah-Lincoln Agricultural High School, Wesson, Miss.
- Miss Lillie Mae Covington, Copiah-Lincoln Agricultural High School, Wesson, Miss.
- Mrs. J. M. Ewing, Copiah-Lincoln Agricultural High School, Wesson, Miss.
- Miss Ruth Smith, Wilkinson County Agricultural High School, Woodville, Miss.